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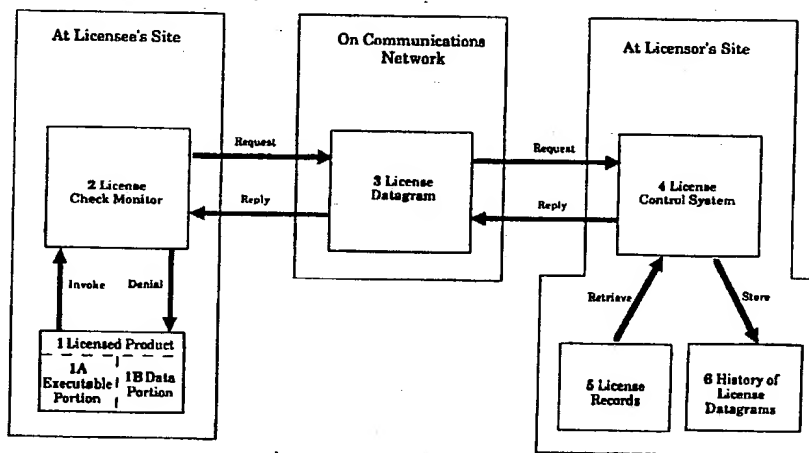
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(54) Title: LICENSE MANAGEMENT SYSTEM AND METHOD



(57) Abstract

A license management system and method for recording (6) the use of licensed product (1), and for controlling (4) its use. A licensed product invokes a license check monitor (2) at regular time intervals. The monitor generates request datagrams (3) which identify the licensee and the product and sends the request datagrams over a communications facility to a license control system (4). The license control system maintains a record (6) of the received datagrams, and compares the received datagrams to data stored in its licensee database (5). Consequently, the license control system (4) transmits reply datagrams with either a denial or an approval message. The monitor (2) generates its own denial message if its request datagrams are unanswered after a predetermined interval of time. The datagrams are counted at the control system to provide billing information.

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- 1 -

LICENSE MANAGEMENT SYSTEM AND METHOD

BACKGROUNDField of the Invention

5 The present invention generally relates to
systems for managing licenses of products such as
computer software, video games, CD-ROM information,
movies and other video products, music and other audio
products, multimedia products, and other systems for
up-to-date recording of actual usage of such a
10 licensed product to enable efficient billing therefor.

Description of Related Art

15 Licenses for information products such as
computer software, music, video products and the like
usually provide licensees with limited rights. The
licenses may restrict sites of use, duration of use,
or number of concurrent uses of the products. The
licenses also may limit the use of the products
depending on currentness of licensee's payments.
However, enforcing the conditions of the licenses is
20 difficult, because, in general, the licensed products
may be easily copied or "pirated" and used without the
licensor's knowledge.

25 Compliance with limited license rights has been
encouraged with copy protection. Known methods of
computer software copy protection include putting a

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physical hole or mark on the diskette containing a product, or placing data on the diskette in a location where no data is expected. A disk with an illegally copied software product usually would not contain the marks. At the beginning of its operation, a copy-protected, but illegally copied software product would search its own diskette for the marks. Upon failing to detect the marks, the software would abort from its normal procedures.

10 Most software products sold today do not have such copy protection, partly because copy protection renders legitimate duplication of copy protected software difficult, but not impossible. Copy protection frustrates the making of legitimate copies, while not eliminating unauthorized copying. Many software publishers have experienced higher sales by eliminating copy protection schemes.

20 Another method for enforcing limited licensing rights of computer software is described in U.S. patent No. 4,932,054 to Chou. Chou describes a "coded filter" hardware device which is plugged into a port of a computer. The "coded filter" outputs an authorization control code when a predetermined control code is sent to it. The licensed software functions properly only if the "coded filter" transmits the correct authorization control code to the software.

30 While devices such as described by Chou have existed for several years, they have not been well accepted by the market. Since the device is attached to the outside of a computer, it can easily be lost or stolen, preventing the use of licensed software. In addition, if a licensee purchased a number of software

products, each of which used Chou's protection scheme, the licensee would collect a stack of "coded filters."

5 Hershey, in U.S. patent No. 4,924,378, describes a method for limiting the number of concurrent uses of a licensed software product. Each workstation of a network has a license storage area in its local memory. License Management System (LMS) daemons are provided in the network in a number corresponding to the permissible number of concurrent uses of the software product. To use the software, a work station stores a daemon in its license storage area. If all daemons are in use, no further work stations may use the software.

15 Robert et al., in U.S. patent No. 4,937,863, describe a similar invention. This invention includes a license management facility which accesses a database of license information related to licensed computer software programs. When a user attempts to use a licensed program, the license management facility first checks the database. Access to the licensed product is prevented if licensing conditions related to the product are not satisfied (e.g., expiration of licensing dates, etc).

25 While the Robert et al. and Hershey patents show effective techniques for controlling licensed computer software, each also reveals components that cannot be easily managed by an average user. A system manager, or someone with special access privileges to the internals of a machine, must install the licensed software. This hinders the distribution of the software.

30 Licensable products other than computer software have not generally been copy-protected. For example,

video tapes can be easily copied by anyone with two VCR machines, and audio tapes and music CDs can be easily copied to tape. Computer CD-ROMs can be copied to magnetic disk; however, their large information storage capacity relative to that of magnetic disks makes this a very expensive proposition. The introduction of digital audio tape is being delayed, because some view its ability to easily produce very high quality copies as a threat to music royalties.

10 Hellman, in U.S. patent No. 4,658,093, describes means to bill by usage. This is accomplished via communication of an encrypted authorization code from a licensor to a base unit at the licensee's site. The encrypted authorization code contains information

15 related to an identification of the base unit, a number of uses requested, and a random or non-repeating number; however, implementation of Hellman's scheme requires a "base unit", such as a computer, video game unit, record player, video recorder, or

20 video disk player, with a unique identification number. The requirement is difficult to satisfy, because, at the present, only a fraction of such systems on the market have an internally readable serial number for identification. In addition,

25 vendors of these systems provide no guarantees for the uniqueness of any given device's serial number. Furthermore, an internal serial number can change when hardware maintenance is performed on the device. Also, Hellman's approach requires that an identical

30 copy of each software product be stored at the authorization site. These copies are used in the generation of unique keys. The unstated assumption that all copies of a specific version of a software

product are identical is unrealistic. Minor bug fixes to software are often made without generating a new version of the product. Also, some software products, such as those which run on Macintosh computers, are self-modifying.

While Hellman's invention counts each use of the software, it does not monitor the duration of use. Thus, Hellman's system would not be able to bill for extensive use of licensed software if the software were continuously operated. Finally, while Hellman suggests the inclusion of an automated communication system as part of his invention, he does not disclose how this communication system could be implemented. Instead, he mentions non-automated use of telephone and mail. In summary, Hellman's patent is an interesting discussion of cryptographic techniques, but it does not provide a practical, real-world implementation of those techniques.

Shear, in U.S. Patent No. 4,977,594, describes a system and method to meter usage of distributed databases such as CD-ROM systems. The method describes a hardware module which must be part of the computer used to access the distributed database. This module retains records of the information viewed. Once the module storage is filled, the module must be removed and delivered to someone who will charge for the usage recorded therein and set the module back to zero usage. Like Hellman's method, this method requires a hardware module which must be incorporated within the computer so the system can control user access. No database publisher will be able to use this method until there are a very large number of units containing such modules. Hardware manufacturers

will be hesitant to include the module in the design of their computers until there is sufficient demand from customers or publishers for this system. The method and apparatus according to the present invention can be implemented entirely in software and hence does not require special, dedicated computer subsystems.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a license management system and method which can ensure that a licensed product is used only on machines under which it is licensed.

It is another object of the present invention to provide a license management system and method which may terminate access to a licensed product once its license has expired.

It is yet another object of the present invention to provide a license management system and method which may terminate access to a licensed product when payment for a license is overdue.

It is a further object of the present invention to provide a license management system and method which can limit the number of concurrent uses of a licensed product.

It is yet another object of the present invention to provide a license management system and method which can bill licensees for the duration of actual usage of a licensed product.

The present invention provides an advantageous feature of quickly and effectively implementing license agreements between a licensor and licensee.

The present invention provides another advantageous feature of allowing logic used to control licenses to be easily changed.

5 The present invention provides yet another advantageous feature of detecting, at the licensor's site, many types of attempts to alter the license management system.

10 The present invention provides a further advantageous feature of permitting anyone without special access privileges to install a licensed product.

15 In the present invention, a licensed product generates request "datagrams," messages transmitted over a communications network. The request datagrams are sent to the licensor's site. At the licensor's site the datagram is compared to information stored in a license database. After the comparison, a reply datagram is sent to the licensee. Upon receiving the reply datagram, the licensed product reacts in
20 accordance with the instructions therewithin. For example if a reply datagram contained a "denial," the licensed product would display an appropriate message to the user and then suspend further execution of its programs.

25 In the present invention, the licensed product is implemented on a network node attached to a communications network that includes the licensor. The network node may be a computer, a CD-ROM player, a tele-computer or other multimedia machine, or any
30 other appropriate device. The node may also be an intelligent type of consumer electronic device used for presenting information, such as an intelligent television, VCR, videodisk player, music CD player,

audio tape player, telephone or other similar device. Further, the communications network may be any two-way network such as a computer network, telephone network, a cellular telephone network or other
5 wireless network, a two-way cable TV network, or any other equivalent system.

Should the user detach the node from the network, the licensed product will fail to receive reply datagrams. Upon several failures to receive reply
10 datagrams, the licensed product will generate its own denial.

After a request datagram has been sent out, a user may be permitted to use the licensed product for a limited duration. This feature may be necessary
15 because of the delays in network communications. When networks are sufficiently fast, use of a licensed product can be postponed until the reply datagram is received.

In the preferred embodiment of the present
20 invention, licensees' network addresses are used to identify the licensees. Other embodiments may use a licensed product serial number or hardware serial numbers for the identification.

A licensed product as in the present invention
25 generates a request datagram after each period of product use. The number of request datagrams received by the licensor can be used to bill the licensee. For example, if datagrams are sent after every hour of product use, the licensee will be billed for the
30 amount equal to the number of request datagrams received by the licensor multiplied by the hourly rate.

The embodiments of the present invention may incorporate a query system at a licensor's site for reporting on problem datagrams. This would allow the licensors to take appropriate actions in accordance
5 with problems associated with each datagram.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other objects and advantages of this invention will become more apparent and more readily appreciated from the following detailed description
10 of the presently preferred exemplary embodiment of the invention, taken in conjunction with the accompanying drawings, of which:

FIGURE 1 is a general block diagram of the preferred exemplary embodiment of the present
15 invention;

FIGURE 2 shows representative diagrams of the contents and formats of data at licensee's site, contained in datagrams, and at licensor's site;

FIGURE 3 illustrates a sequence of representative
20 operations executed at the licensee's site and at the licensor's site, together with required inputs for the execution of the operations and with outputs produced therefrom;

FIGURE 4 illustrates a sequence of representative
25 operations to send a request datagram, together with required inputs for the execution of the operations and with outputs produced therefrom;

FIGURE 5 illustrates a sequence of representative
30 operations when a reply datagram is overdue, together with required inputs for the execution of the operations and with outputs produced therefrom;

FIGURE 6 shows a sequence of representative operations to process a reply datagram, together with required inputs for the execution of the operations and with outputs produced therefrom;

5 FIGURE 7 shows a sequence of representative operations to generate an authorization code, together with required inputs for the execution of the operations and with outputs produced therefrom; and

10 FIGURE 8 shows a sequence of representative operations to send a reply datagram, together with required inputs for the execution of the operations and with outputs produced therefrom.

DETAILED DESCRIPTION OF THE
PRESENTLY PREFERRED EXEMPLARY EMBODIMENT

15 As shown in FIGURE 1, a licensed product 1 is located at a licensee's site. Product 1 may include a data portion 1B and a functional portion 1A such as computer software product or any other kind of information product used to control use of data
20 portion 1B. If data portion 1B is CD-ROM database information, functional portion 1A should enable the licensee to search indexes and display text. If data portion 1B is video information, functional portion 1A should control the display of the video information.
25 For audio information, functional portion 1A should play the audio information. If data portion 1B is an electronic book, functional portion 1A should display and turn pages. The above examples show some of the ways functional portion 1A can control data portion
30 1B; however, they are hardly exhaustive.

By including in product 1 both information and software which controls the information, product 1 is

an executable product. Non-software information in product 1 is preferably encrypted so that it cannot be easily extracted from the product.

License check monitor 2 sends license datagrams 3 to the licensor and also receives license datagrams 3 from the licensor. License check monitor 2 also prevents further use of product 1 when a datagram 3 containing a "denial" message is received.

License datagrams 3 are messages that describe information related to the use of licensed product 1. Datagrams 3 are sent over a communications network between the licensee and licensor. Initially, the licensee sends a request datagram 3 over the network to the licensor. The licensor then returns a reply datagram containing either an approval or denial. It is also possible to implement the present invention by having the licensor transmit a reply datagram only for approvals.

At the licensor's site, license control system 4 makes licensing decisions by comparing request datagram 3 with license records 5. After the comparison, control system 4 stores information related to request datagram 3 into history of license datagram record 6. It is noted that request datagrams 3 are periodically sent while product 1 is in use. Thus, the history of license datagrams in record 6 provides means for measuring the duration of use of product 1.

Representations of data and records stored at the licensee's site, contained in datagrams, and stored at the licensor's site are illustrated in FIGURE 2. At the licensee's site, network service 7, which handles delivery and transmission of datagrams 3, supplies

network address 8. It is by this address that license control system 4 identifies a location of use of product 1.

5 Licensed product record 9 is contained within monitor 2. Within the license product record 9 is an identification record 10, which contains the following two items: licensor's network address 11, and product model number 12 that identifies product 1. When a
10 licensor has only one product, or uses different licensor network addresses 11 for each product, product model number 12 may not be needed.

 Datagram sent record 13 stores information about the last sent datagram 3. It includes a datagram number 14, which uniquely identifies the last
15 transmitted datagram 3, and the date and time 15 when the last datagram 3 was sent from the licensee's site.

 Licensed product record 9 also contains control parameters record 16, which is used for controlling the timing of key events in the communication of
20 license check monitor 2 with license control system 4. Send interval 17 specifies a time interval between each transmission of a new datagram 3 from the licensee to the licensor.

 Wait interval 18 is the length of time that
25 monitor 2 waits to receive a reply datagram 3 before resending the same request datagram 3. The duration of this interval depends on the speed of the communications network being used to deliver datagrams 3.

30 Disconnect allowed interval 19 is the duration of time that monitor 2 allows product 1 to be used without a reply datagram 3 from the licensor. The duration of this interval depends on the reliability

of the communications network. The interval must be long enough to take into consideration network downtime. For example, suppose a message was sent from the licensor and the network went down just afterwards. Disconnect allowed interval 19 should be long enough to allow the network to resume its normal operation and successfully deliver datagrams 3 from the licensor; otherwise, the licensee would be forced to stop using product 1 until the network was operational.

License datagram 3 contains header 20. Header 20 is used during execution of low level communication protocols within the network. Source network address 21 is the network address from where datagram 3 is sent. Destination network address 22 is the network address to where datagram 3 is sent. Additional data may be included in header 20 if required by low level protocols used in delivering datagrams 3.

Data 23, a part of datagram 3, conveys a message, and contains a number of fields. Product model number 24 and datagram number 25 identify product 1 and datagram 3, respectively. It is noted that retransmitted datagrams have an identical datagram number. Duplicate datagrams must be identified at a licensor's site so that they do not all contribute in billing a licensee.

Each datagram number 25 is unique for each request datagram 3 transmitted from the licensee, except for retransmitted datagrams. This allows a reply datagram 3 received by a licensee to be verified as an actual reply to a request datagram 3 from that licensee, as explained below.

Number of processes running 26 is the number of concurrent uses of product 1 at the time datagram 3 is sent. Authorization code 27 is used on reply datagrams 3 to indicate an approval or a denial.
5 Message text 28 contains a message which will be displayed to the user upon a denial.

License database 29 at the licensor's site holds records of information about customers, licenses, and license usage. The types of information within
10 license database 29 of the present embodiment are shown in FIGURE 2. However, a specific license management system may require its license database to hold types of information other than those in FIGURE 2. For example, licensee name and address may be
15 incorporated as a part of a license database 29.

License record 5 contains information on licenses. Licensee network address 30 identifies a precise network node which is licensed to use product 1. If request datagrams are received which do not
20 originate from known licensee network addresses 30, reply datagrams containing denial messages are transmitted. Product model number 31 is the model number of a licensed product. Termination date 32 is the expiration date of a license. When the license of
25 a product is issued for an unlimited duration, termination date 32 should reflect a date very far into the future, relative to the licensing date.

The present embodiment allows licenses to be paid for in a lease-like or rental fashion. If a licensee
30 were to rent or lease product 1, paid through date 33 would reflect the date through which the licensee has paid for using the product. Grace period 34 is the time interval for which the licensee is allowed to be

delinquent before services are disconnected. Grace period 34 would reflect a very large time interval if the license is not of a lease-like or rental type. When the license provides for a limit on the number of concurrent uses of a product 1, number of processes licensed 35 contains the limiting number. When the license does not provide for such a limit, number of processes 35 should be a very large number.

History of license datagrams 6 is an archive of datagrams 3 received from the licensee.

FIGURE 3 illustrates operations executed at the licensee's site and at the licensor's site. An overview of the processing at the licensee's site is described by steps 101.0 to 106.0, and an overview of the processing at the licensor's site is described by steps 107.0 to 110.0.

At the licensee's site, at step 101.0, product 1 invokes monitor 2. This is accomplished by first establishing monitor 2 as a handler for a timer expiration interrupt signal and for received datagrams 3. Next, a timer is set with a very short time to cause an initial call to monitor 2. At step 102.0, monitor 2 computes a time 36 since the last datagram was sent by determining the difference between the current date and sent time and date and time 15 that a datagram was last sent from the licensee's site. When product 1 commences execution, datagram sent date and time 15 is set to "null." Thus, time since send 36 is very large at the beginning of the monitor's execution. At step 103.0, time since send 36 is compared to send interval 17. If time since send 36 is greater than send interval 17, then a request datagram is transmitted, per the steps described in

FIGURE 4. Step 104.0 first checks if a reply to the last datagram has arrived and if wait interval 18 has expired. If a reply has not arrived and the wait interval has expired, steps 104.1-104.3 (FIGURE 5) are executed. Step 105.0 processes authorization code 27 in a reply when the reply is received, in accordance with steps 105.1 to 105.5 (FIGURE 6). At step 106.0, product 1 resumes normal execution of its programs until the next interrupt signal is generated.

At the licensor's site, license control system 4 receives and processes datagram 3, in accordance with steps 107.0 to 110.0. Step 107.0 receives request datagram 3. Step 108.0 generates authorization code 27, per steps 108.1 to 108.8 (FIGURE 7). Step 109.0 creates reply datagram 3 and transmits the datagram to the licensee via steps 109.1 to 109.5 (FIGURE 8).

FIGURE 4 shows the procedure which monitor 2 follows for sending request datagram 3 to the licensor. Step 103.1 sets source network address 21 in datagram 3 to the network address 8 of the licensee's location on the network. Step 103.2 sets destination network address 22 to licensor's network address 11. Step 103.3 encrypts product model number 12 for datagram 3. Step 103.4 assigns a unique number to datagram 3, encrypts the number, and stores it as datagram number 14. This number is altered when an entirely new datagram 3 is sent. Datagrams which are retransmitted have the same datagram number 25 as the original. As already explained, this allows license control system 4 to identify duplicate datagrams.

Step 103.5 counts the number of processes using product 1, currently running, encrypts the count, and stores the encryption as the number of processes

running 26. In the UNIX operating system, this procedure could be performed using the command "ps" to obtain a list of current processes, the command "grep" to extract the processes of product 1, and "wc" to
5 count the number of processes. Step 103.6 sets authorization code 27 to number 255 and encrypts the number.

Number 255 indicates that datagram 3 is a request for authorization. Such an indication is needed to
10 guard the present system against the following steps for circumventing the present invention: intercepting outgoing datagrams; and inputting the intercepted datagrams to monitor 2.

Step 103.7 stores the current date and time as
15 sent date & time 15. This date is needed to compute when to send the next datagram 3. Step 103.8 assigns a value to send interval 17, which sets an alarm for invoking monitor 2 to send the next datagram 3. Step 103.9 sends datagram 3.

20 In the present embodiment a datagram is transmitted via a connectionless datagram service. Methods for transmission are well documented for some networking systems. For example, TCP/IP (Transport Control Protocol/Internet Protocol) includes a connectionless protocol called UDP (User Datagram
25 Protocol). A method for sending a datagram using UDP protocol from a SUN Microsystem computer is documented in a SUN manual titled, Network Programming Guide, in section 9 titled "Transport Level Interface
30 Programming."

Step 103.10 sets another alarm using wait interval 18 for retransmitting datagram 3, if no reply datagram has been received. The alarm causes monitor

2 to be invoked for checking whether a reply datagram
3 has been received. Monitor 2 will transmit a
duplicate of the previously transmitted datagram, if
no reply has been received. After the execution of
5 step 103.10, "Send License Datagram" procedure returns
system control to step 104.0 in FIGURE 3.

FIGURE 5 shows the operation of the "Reply
Datagram is Overdue" procedure. Step 104.1 compares
time since the last datagram was sent 36 to disconnect
10 allowed interval 19, which, as described above, is the
interval that product 1 is allowed to operate even if
a reply is overdue. If time since send 36 is smaller
than disconnect allowed interval 19, datagram 3 is
retransmitted via executing step 103.9 in FIGURE 4.
15 Step 104.2 "disconnects" product 1 from further
service, if time since send 36 is greater than
disconnect allowed interval 19.

Step 104.2 comprises a sequence of sub-steps
104.2.1-104.2.3. Step 104.2.1 assigns number 5 to
20 authorization code 27 in the current datagram being
processed. Value 5 is interpreted by monitor 2 as a
denial. Step 104.2.2 sets message text 28 to the
following: "A reply from licensor to numerous
authorization requests was never received. This
25 product must be connected to a communications network
in order to function." Step 104.2.3 transfers system
control to step 105.3 in FIGURE 6. Step 105.3
processes the current denial datagram 3 as if it were
just received.

30 Through the execution of steps 104.1-104.3, the
present system permits the use of product 1 for a
prescribed period of time. After the prescribed

period of time has elapsed, the present system generates a denial.

FIGURE 6 illustrates the steps which monitor 2 follows in processing a reply datagram 3. Step 105.1
5 decrypts all encrypted data in the received datagram. Step 105.2 compares datagram number 25 with datagram number 14 associated with the last datagram. If datagram number 25 is not equal to datagram number 14, step 105.2 ignores the current datagram and transfers
10 procedural control to step 103.9 (FIGURE 4) in order to resend the last transmitted datagram. After disconnect allowed interval 19 elapses, monitor 2 generates a denial.

In essence, step 105.2 guards against the
15 circumvention of the present invention via: (1) intercepting a reply datagram 3 (from the licensor) containing an approval (2) storing the reply datagram 3; and (3) inputting the stored datagram to monitor 2.

If the execution of step 105.2 does not transfer
20 its procedural control to step 105.3, and if authorization control 27 is not zero (indicating an unqualified authorization has not been received), step 105.3 processes authorization code 27 via steps 105.3.1 to 105.3.3. Step 105.3.1 retrieves message
25 text 28 from datagram 3. If message text 28 is null, then the current datagram 3 is ignored, and monitor 2 resends the last transmitted datagram 3. Step 105.3.1 further protects the present system from attempts to generate fake datagrams and to feed the fake datagrams
30 to monitor 2 by checking for a proper authorization code of zero.

If message text 28 is not null, step 105.3.2 presents the message 28 to the user on an output

device such as a CRT screen. Step 105.3.3 terminates the current use of product 1. This step may be implemented by subroutine or function call to a simple exit that saves any current user data to a file.

5 Alternatively, product 1 may be designed so that, upon being directed to terminate further execution, it first gives the user an opportunity to save their data.

If authorization code 27 is zero, step 105.4
10 allows further use of product 1. Step 105.5 returns procedural control to 106.0 on FIGURE 3.

FIGURE 7 shows a sequence of operations within the "Generate Authorization Code" procedure. The procedure produces appropriate authorization code 27
15 when a request datagram 3 is received at the licensor's site.

Step 108.1 decrypts all encrypted data in the received datagram 3. Using source network address 21 and product model number 24 in the datagram 3, step
20 108.2 searches the license database 29 for matching licensee network address 30 and product model number 31. If license database 29 does not contain a record of product model number 24 of the product 1 being licensed to the licensee, step 108.3 sets
25 authorization code 27 of its reply datagram 3 to 1 (i.e., the sending node is not a registered address) and authorization is denied.

Step 108.3 prevents copies of product 1 from being installed on multiple nodes independently of
30 whether they are within or outside the licensee's organization. Step 108.3 also prevents the licensee from transporting product 1 from one node to another node without the licensor's approval. This is

important because the two nodes may have different processing capacities, and they may be billable at different rates.

5 If the date a request datagram is received is later than license termination date 32, step 108.4 sets authorization code 27 to number 2 (i. e., license has expired). Step 108.4 allows the licensor to fix licensing periods, or to determine free trial periods for the use of the product. The licensing period may
10 be extended by resetting license termination date 32 at the licensor's site.

If the date when the datagram is received is later than the paid through date 33 as extended by the grace period 34, step 108.5 sets authorization code 27
15 to 3 (i.e., payment is past due).

If the number of processes running 26 exceeds a licensed number of concurrent uses of product 1 (at a particular node), then step 108.6 sets authorization code 27 to 4 (i.e. concurrent process usage limit is
20 exceeded).

Step 108.7 sets authorization code 27 to 0 indicating processing can continue. It is noted that steps 108.3-108.7 are a part of a

25 IF (x1) then (y1)
ELSE if (x2) then (y2)
ELSE if (x3) then (y3) ...

statement of a procedure (e. g., FORTRAN, PASCAL, C, etc). Thus, only one of the steps 108.3-108.7 is executed. Step 108.7 sets authorization code 27 to 0
30 (indicating approval of further use) only if steps 108.3-108.6 do not execute the THEN portion of each step. Step 108.7 also stores the received datagram 3 in history of license datagrams 6.

Step 108.8 is the last of authorization processing rules 108.1-108.7. After the execution of steps 108.3-108.7, step 108.8 returns procedural control to step 109.0 in FIGURE 3.

5 FIGURE 8 illustrates the steps which license control system 4 follows to send reply datagram 3 to the licensee.

Step 109.1 encrypts authorization code 27 and writes the encrypted code into datagram 3. Next, step 10 109.2 writes message text 28 corresponding to authorization code 27 into datagram 3.

Step 109.2 may be replaced with the following method for relaying proper messages to a product user. Proper messages corresponding to each authorization 15 code is stored in monitor 2 at each licensee's site. Upon reception of a reply datagram 3, monitor 2 would locate within itself the proper message corresponding to the authorization code, and use the message for various purposes. This method would reduce the size 20 of reply datagrams 3. However, if the licensor wanted to implement new denial codes, each product would need to somehow incorporate the new message associated with the new denial code into itself. The list of messages, one of which may be written as message text 25 28, are as follows:

AUTHORIZATION
CODE

TEXT MESSAGE

30	1 This product is not licensed to run at this location. Please contact the licensor to either license this product, or move an existing license of your organization to this location. Use of this product at this
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- 23 -

location is discontinued until this problem is resolved.

2
5 Your license on this product has expired. Please contact licensor in order to have your license extended. Use of this product is discontinued until this problem is resolved.

10 3 Payment on this licensed product is over due and past your grace period. Please have your accounting department send payment in order to continue your license. Use of this product is discontinued until this problem is resolved.

20 4 Your current use of this licensed product exceeds limits for the number of uses your organization has licensed. Please try again later.

25 5 A reply from licensor to numerous authorization requests was never received. This product must be connected to a communications network in order to function.

0 Authorization is OK. There is no message.

30 Step 109.3 swaps source network address 21 and destination network address 22. Step 109.4 transmits datagram 3 back to monitor 2.

35 At step 109.5, a communications network delivers datagram 3 to monitor 2. Subsequently, procedural control returns to step 107.0 in FIGURE 3 to process the next datagram 3.

Although only a few exemplary embodiments of this invention have been described in detail above, those skilled in the art will readily appreciate that many

modifications are possible in the preferred embodiments without materially departing from the novel teachings and advantages of this invention. For example, product 1 was described as sometimes
5 consisting of information as well as software which controls the information. This approach provides the greatest flexibility, but it is also possible to include the software which controls the information in the networked machine at the licensee's site. In this
10 case, product 1 is split, with part of it on media and part on the licensee's machine. By doing this, some space can be saved on the media containing product 1, but the capabilities of these products will be limited by the standard functions available on these machines.

15 Also, the presently described embodiment includes a product 1 which is at the licensee's site. This implies that product 1 is on some physical media such as diskette, tape, or CD. However, product 1 can be electronically delivered over communications lines to
20 the licensee and therefore might exist in the memory of the licensee's machine, rather than any physical media. In the case of a product such as music, radio programs and the like, product 1 may even be broadcast to the licensee's site for playback; thus, the product
25 1 would not even be "resident" in the licensee's machine.

The presently described embodiment allows the licensee to access the licensed product concurrent with the sending and receiving of datagram 3. In this
30 way, the present invention does not inconvenience the legitimate licensee; however, for sensitive licensed products such as confidential information, the license

check monitor 2 can prevent access to the product 1 until an authorization reply datagram 3 is received.

Further, monitor 2 could be realized as an integral part of product 1. Monitor 2 could also be
5 implemented as: 1) a separate process which is the parent process of product 1 (Such a parent process would have the authority to cancel the use of product 1); 2) a single system level task which controls license checking of all products at the licensee's
10 site; and 3) custom logic in a digital integrated circuit (the present invention could be implemented as hardware instead of software).

Also, though the above embodiment has been described as being implemented on a computer system
15 network where operator messages are provided on a CRT monitor or the like, the invention may be practiced on other hardware platforms by incorporating appropriate changes known to those of ordinary skill in the art. For example, in an alternative hardware
20 embodiment such as a music or video playback device, monitor 2 is invoked by the licensee's action of pushing the "play" or similar button, and in a broadcast music application or similar system, the monitor may be invoked simply by turning the device
25 on. The processing of monitor 2 is as described in the presently described embodiment. However, when a denial message is received or generated, monitor 2 must be able to switch "play" to "off".

The presently described embodiment is designed
30 to be used in conjunction with a connectionless UDP (User Datagram Protocol) in the TCP/IP protocol suite as an underlying protocol. However, the present invention could also be realized using a slower,

connectionless protocol such as electronic mail or a variety of connection protocols (e. g., File Transfer Protocols (FTP), Telnet).

5 It is noted that protocol suites quite different from TCP/IP could be used, such as ISO (International Standards Organization) protocol. In addition, datagrams 3 could be sent over telephone systems with communications protocols such as those specified by CCITT (Consultative Committee on International
10 Telephony and Telegraphy). In this case, telephone numbers could serve as network addresses 21, 22. Communications protocols for wireless communications such as cellular telephone can also be used to send the datagram 3.

15 Accordingly, all such modifications are intended to be included within the scope of this invention as defined by the following claims.

WHAT IS CLAIMED IS:

1. A method for monitoring the use of a licensed product, comprising the steps of:
 - generating, at regular time intervals,
5 datagrams including an address in a communications facility, said facility address identifying a licensee;
automatically sending said datagrams from
at least one licensee's site over said facility to a
10 licensor's site while said licensed product is in use;
receiving said datagrams at said licensor's site;
storing an indication of receipt of each of
said datagrams; and
15 counting said datagrams from each licensee as an indication of the use by the licensee of said licensed product.
2. A method as in claim 1 further wherein:
 - said generating step includes the step of
20 incorporating a model number of said product in said datagrams; and
said counting step includes the step of
separately counting datagrams for each product model
number for each licensee.
- 25 3. A method as in claim 1, wherein said generating step includes the step of automatically obtaining said facility address that identifies said licensee from said facility without any data being provided by said licensee.

- 28 -

4. A method for controlling use of a licensed product comprising the steps of:

generating a request datagram including an address in a communications facility, said facility
5 address identifying a licensee;

automatically sending said request datagram from at least one licensee's site over said facility to a licensor's site while said licensed product is in use;

10 receiving said request datagram at said licensor's site;

comparing said received request datagram with rules and license data at said licensor's site to determine if use of said licensed product is
15 authorized;

sending a reply authorizing datagram to said licensee's site if use of said licensed product is approved; and

receiving said reply authorizing datagram at
20 said licensee's site and denying the use of said product when no reply authorizing datagram is received.

5. A method as in claim 4, wherein:

said generating step includes the step of
25 incorporating a model number of said product in said datagram;

said comparing step includes the step of comparing said rules and license data for a particular model number; and

30 said sending step includes the step of transmitting said reply datagram for each product model number.

- 29 -

6. A method as in claim 4, wherein said generating step includes the step of automatically obtaining said facility address that identifies said licensee from said facility without any data being
5 provided by said licensee.

7. A method as in claim 4 further comprising the step of sending a reply denial datagram if use of said licensed product is not approved as determined in said comparing step, said step of automatically
10 sending said request datagram from a licensee's site including the step of resending said request datagram if neither a reply authorizing datagram nor a reply denial datagram is received from said licensor's site within a predetermined time from sending said request
15 datagram from said licensee's site.

8. A method as in claim 4, wherein said step of automatically sending said request datagram from said licensee's site includes the step of sending a request datagram at regular time intervals.

20 9. A method as in claim 4, wherein:
said generating step includes the step of providing a datagram identification code within said datagram;

said reply datagram sending step includes
25 the step of inserting the same datagram identification code in said reply datagram; and

said reply receiving step rejects said reply authorizing datagram if the datagram identification code included in said reply authorizing datagram does

SUBSTITUTE SHEET

- 30 -

not match the datagram identification code included in said request datagram.

10. A method as in claim 4, wherein:

5 said comparing step includes the step of comparing said facility address that identifies said licensee with a list of valid licensee addresses to determine if said facility address is a valid address; and

10 said reply authorizing datagram is not sent if said facility address that identifies said licensee is not valid.

11. A method as in claim 10 further comprising the step of sending a reply denial datagram if said facility address that identifies said licensee is not
15 valid.

12. A method as in claim 4, wherein:

 said comparing step includes the step of comparing a license expiration date with a date at which said datagram is received; and

20 said reply authorizing datagram is not sent if the license expiration date is later than the date at which said datagram is received.

13. A method as in claim 12, further comprising the step of sending a reply denial datagram if the
25 license expiration date is later than the date at which said datagram is received.

14. A method as in claim 4, wherein:

SUBSTITUTE SHEET

said comparing step includes the step of checking currentness of payments from said license; and

5 said reply authorizing datagram is not sent if payment is overdue.

15. A method as in claim 14, further comprising the step of sending a reply denial datagram if payment is overdue.

16. A method as in claim 4, wherein:

10 said generating step includes the step of incorporating in said datagram data indicative of the number of processes currently using said product at said licensee's site;

15 said comparing step includes the step of comparing the number of processes using said product at the licensee's site to an authorized number; and

 said reply authorizing datagram is not sent if said number of processes using said product exceeds said authorized number.

20 17. A method as in claim 16, further comprising the step of sending a reply denial datagram if said number of processes using said product exceeds said authorized number.

25 18. A method as in claim 4, wherein said sending step includes the steps of sending said reply authorizing datagram when use of said product is approved and sending a reply denial datagram when use of said product is not approved, said receiving step

denying use of said product when said reply denial datagram is received.

19. A method as in claim 18, wherein said receiving and denying step denies use of said product
5 when neither a reply authorizing datagram nor a reply denial datagram is received within a predetermined time after said request datagram is sent.

20. A method as in claim 18, further comprising the step of indicating, at a licensee's site, a reason
10 for denial when said reply denial datagram is received.

21. A method as in claim 4, wherein:
said licensed product comprises an executable portion and a data portion; and
15 said method further comprises a step of controlling use of said data portion with said executable portion.

22. A method as in claim 4 further comprising a step of allowing use of said licensed product before
20 a reply datagram is received.

23. A system for controlling licensed product comprising:
a communications facility to which at least one licensee having a license for operating a licensed
25 product from the licensor is connected;
monitoring means, connected to said facility at a site of each said licensee, for generating a request datagram including an address of said licensee

on said facility and transmitting said request datagram over said facility to a site of said licensor, and for receiving and processing a reply datagram; and

5 controlling means, connected to said facility at said licensor's site, for receiving said request datagram, comparing said request datagram with rules and license data to determine if use of said licensed product is authorized and sending a reply
10 authorizing datagram to said licensee's site if use of said product is approved; and

 said monitoring means including means for denying use of said licensed product when no reply authorizing datagram is received.

15 24. A system as in claim 23, wherein:

 said monitoring means sends request datagrams at regular time intervals during use of said licensed product; and

 said controlling means further comprises
20 means for counting said request datagrams received at said controlling means and means for computing an amount to be billed to said licensee in response to said counting.

 25. A system as in claim 23 wherein:

25 said monitoring means incorporates a model number for said product in said request datagram; and

 said controlling means comprises means for counting datagrams for each product model number for each licensee, in order to compute an amount to be
30 billed to each licensee.

26. A system as in claim 23, wherein said monitoring means automatically obtains said facility address of said licensee from said facility without any input from said licensee.

5 27. A system as in claim 23, wherein:
 said controlling means sends a reply denial datagram to said licensee's site if use of said product is not approved; and

 said monitoring means resends said request
10 datagram if no reply authorizing datagram and no reply denial datagram is received within a predetermined period of time after said requesting datagram is sent.

 28. A system as in claim 23, wherein said monitoring means transmits request datagrams at
15 predetermined time intervals.

 29. A system as in claim 23, wherein:
 said monitoring means incorporates a unique identification code in said request datagram;
 said controlling means incorporates the same
20 request datagram identification code in said reply authorizing datagram; and
 said monitoring means rejects any reply authorizing datagram which does not include the same identification code as included in said request
25 datagram.

 30. A system as in claim 23, wherein said controlling means compares said facility address of said licensee with a list of valid licensee facility addresses and does not generate a reply authorizing

datagram if said facility address of said licensee is not valid.

31. A system as in claim 30, wherein said controlling means sends a reply denial datagram when
5 said facility address is not valid.

32. A system as in claim 23, wherein said controlling means compares an expiration date of a license of said product with a date at which said request datagram is received by said controlling
10 means, and does not generate a reply authorizing datagram, thus denying use of said product, if the license expiration date is earlier than the date at which said request datagram is received.

33. A system as in claim 32, wherein said
15 controlling means sends a reply denial datagram if the license expiration date is earlier than the date at which said request datagram is received.

34. A system as in claim 23, wherein said controlling means generates a reply authorizing
20 datagram, thus denying use of said product, if a payment for the use of said product is overdue.

35. A system as in claim 34, wherein said controlling means sends a reply denial datagram if payment for the use of said product is overdue.

25 36. A system as in claim 23, wherein:
said monitoring means includes in said request datagram data indicative of the number of

processes, at a licensee's site, currently using said product; and

5 said controlling means does not generate a reply authorizing datagram, thus denying a use of said product, if more than a predetermined number of processes using said product are running at the licensee's site.

10 37. A system as in claim 36, wherein said controlling means sends a reply denial datagram if more than said predetermined number of processes using said product are running at the licensee's site.

38. A system as in claim 23, wherein said controlling means sends a reply denial datagram if use of said product is not approved.

15 39. A system as in claim 38, wherein said monitoring means denies use of said licensed product when no reply authorizing datagram and no reply denial datagram is received within a predetermined time from the sending of said request datagram.

20 40. A system as in claim 38, further comprising means for indicating, at a licensee's site, a reason for denial when said reply denial datagram is received.

25 41. A system as in claim 23, wherein:
said licensed product comprises an executable portion and a data portion; and

said system further comprises means for controlling use of said data portion with said executable portion.

5 42. A system as in claim 41, wherein said data portion controlling means is disposed within said executable portion.

43. A system as in claim 41, wherein said data portion controlling means comprises a first partial controlling means disposed within said executable
10 portion and a second partial controlling means disposed within said monitoring means.

44. A system as in claim 23, wherein said monitoring means includes means for permitting use of said licensed product before a reply datagram is
15 received.

45. A system for monitoring product comprising:
a communications facility to which at least one licensee having a license for operating a licensed product from a licensor is connected;

20 monitoring means, connected to said facility at a site of each said licensee, for generating datagrams including an address of said licensee on said facility and transmitting said datagrams at periodic intervals over said facility to a site of
25 said licensor; and

control means, connected to said facility at said licensor's site, for receiving said request datagrams, storing an indication of receipt of each of said datagrams and counting said datagrams from each

- 38 -

licensee as an indication of the use by the licensee of said licensed product.

46. A system as in claim 45, wherein said monitoring means automatically obtains said facility address of said licensee from said facility without
5 any input from said licensee.

47. A system as in claim 45, wherein:
said monitoring means incorporates a product model number in said request datagrams; and
10 said controlling means separately counts request datagrams for each product model number for each licensee.

48. A method for monitoring the use of a licensed product comprising the steps of:
15 generating, at regular time intervals, datagrams including an address in a communications facility, said facility address identifying a licensee; and
automatically sending said datagrams from at
20 least one licensee's site over said communications facility to a licensor's site while said licensed product is in use.

49. A method as in claim 48 further wherein:
said generating step includes the step of
25 incorporating a model number of said product in said datagrams.

50. A method as in claim 48, wherein said generating step includes the step of automatically

obtaining said facility address that identifies said licensee from said communications facility without any data being provided by said licensee.

51. A method for controlling use of a licensed
5 product comprising the steps of:

generating a request datagram including a facility address that identifies a licensee in a communications facility;

10 automatically sending said request datagram from a licensee's site over said communications facility to a licensor's site while said licensed product is in use; and

receiving a reply authorizing datagram at said licensee's site and denying the use of said
15 product when no reply authorizing datagram is received.

52. A method as in claim 51 wherein:

said generating step includes the step of incorporating a model number of said product in said
20 datagram.

53. A method as in claim 51, wherein said generating step includes the step of automatically obtaining said facility address that identifies said licensee from said communications facility without any
25 data being provided by said licensee.

54. A method as in claim 51, wherein:

said reply datagram is one of at least a reply authorization datagram and a reply denial datagram; and

said step of automatically sending said request datagram from a licensee's site includes a step of resending said request datagram if neither a reply authorizing datagram nor a reply denial datagram is received within a predetermined time from sending said request datagram from said licensee's site.

55. A method as in claim 51, wherein said step of automatically sending said request datagram from said licensee's site includes the step of sending a request datagram at regular time intervals.

56. A method as in claim 51, wherein:
said generating step includes the step of providing a datagram identification code within said datagram; and
said reply receiving step rejects said reply authorizing datagram if the datagram identification code included in said reply authorizing datagram does not match the datagram identification code included in said request datagram.

57. A method as in claim 51, wherein:
said generating step includes the step of incorporating in said datagram data indicative of the number of processes currently using said product at said licensee's site.

58. A method as in claim 51, further comprising the steps of:
receiving a reply denial datagram; and
displaying, at a licensee's site, a reason for denial when said reply denial datagram is received.

59. A method as in claim 51, wherein:

said licensed product comprises an executable portion and a data portion; and

5 said method further comprises a step of controlling use of said data portion with said executable portion.

60. A method as in claim 51 further comprising a step of allowing use of said licensed product before a reply datagram is received.

10 61. A system for controlling a licensed product comprising:

a communications facility to which at least one licensee is connected;

15 monitoring means, connected to said communications facility at a site of each said licensee, for generating a request datagram including an address of said licensee on said communications facility and transmitting said request datagram over said communications facility, and for receiving and
20 processing a reply authorizing datagram; and

means for denying use of said product when no reply authorizing datagram is received.

62. A system as in claim 61, wherein:

25 said monitoring means sends request datagrams at regular time intervals during use of said licensed product.

63. A system as in claim 61 wherein:

- 42 -

said monitoring means incorporates a model number for said product in said request datagram.

64. A system as in claim 61, wherein said monitoring means automatically obtains said facility address of said licensee from said communications facility without any input from said licensee.

65. A system as in claim 61, wherein:
said monitoring means resends said request datagram if no reply authorizing datagram and no reply denial datagram is received within a predetermined period of time after said requesting datagram is sent.

66. A system as in claim 61, wherein said monitoring means transmits request datagrams at predetermined time intervals.

67. A system as in claim 61, wherein:
said monitoring means incorporates a unique identification code in said request datagram; and
said monitoring means rejects any reply authorizing datagram which does not include the same identification code as included in said request datagram.

68. A system as in claim 61, wherein:
said monitoring means includes in said request datagram data indicative of the number of processes, at a licensee's site, currently using said product.

69. A system as in claim 61, wherein:

said monitoring means denies use of said licensed product when no reply authorizing datagram and no reply denial datagram is received within a predetermined time from the sending of said request
5 datagram.

70. A system as in claim 61, further comprising means for indicating, at a licensee's site, a reason for denial when a reply denial datagram is received.

71. A system as in claim 61, wherein:
10 said licensed product comprises an executable portion and a data portion; and
said system further comprises means for controlling use of said data portion with said executable portion.

15 72. A system as in claim 71, wherein said data portion controlling means is disposed within said executable portion.

73. A system as in claim 71, wherein said data
20 portion controlling means comprises a first partial controlling means disposed within said executable portion and a second partial controlling means disposed within said monitoring means.

74. A system as in claim 61, wherein said
25 monitoring means includes means for permitting use of said licensed product before a reply datagram is received.

75. A system for monitoring a licensed product comprising:

a communications facility to which at least one licensee is connected;

5 monitoring means, connected to said communications facility at a site of each said licensee, for generating datagrams including an address of said licensee on said communications facility and transmitting said datagrams at periodic
10 intervals over said communications facility.

76. A system as in claim 75, wherein said monitoring means automatically obtains said communications facility address of said licensee from said communications facility without any input from
15 said licensee.

77. A system as in claim 75, wherein:
said monitoring means incorporates a product model number in said request datagrams.

78. A method for monitoring the use of a
20 licensed product comprising the steps of:

receiving datagrams at a licensor's site on a communications facility having at least one licensee's site thereon, said datagrams being generated at regular time intervals and including a
25 facility address that identifies a licensee in said communications facility;

storing an indication of receipt of each of said datagrams; and

counting said datagrams as an indication of
30 the use of said licensed product.

79. A method as in claim 78 further wherein:

said datagrams include a model number of each product; and

5 said counting step includes the step of separately counting datagrams for each product model number for each licensee.

80. A method for controlling use of a licensed product comprising the steps of:

10 receiving a request datagram at a licensor's site on a communications facility having at least one licensee's site thereon, said request datagram including a facility address identifying a licensee and being automatically sent over said communications facility to said licensor's site while said licensed
15 product is in use;

comparing said received request datagram with rules and license data at said licensor's site to determine if use of said licensed product is authorized; and

20 sending a reply authorizing datagram if use of said licensed product is approved.

81. A method as in claim 80 wherein:

said datagrams include a model number of said product;

25 said comparing step includes the step of comparing said rules and license data for a particular model number; and

30 said sending step includes the step of transmitting said reply datagram for each product model number.

82. A method as in claim 80 further comprising the step of sending a reply denial datagram if use of said licensed product is not approved as determined in said comparing step.

5 83. A method as in claim 80, wherein:
 said datagrams include a datagram
 identification code; and
 said reply datagram sending step includes
 the step of inserting the same datagram identification
10 code in said reply datagram.

 84. A method as in claim 80, wherein:
 said comparing step includes the step of
 comparing said facility address that identifies said
 licensee with a list of valid licensee addresses to
15 determine if said facility address is a valid address;
 and
 said reply authorizing datagram is not sent
 if said facility address that identifies said licensee
 is not valid.

20 85. A method as in claim 84 further comprising
 the step of sending a reply denial datagram if said
 facility address that identifies said licensee is not
 valid.

 86. A method as in claim 80, wherein:
25 said comparing step includes the step of
 comparing a license expiration date with a date at
 which said datagram is received; and

- 47 -

said reply authorizing datagram is not sent if the license expiration date is later than the date at which said datagram is received.

87. A method as in claim 86, further comprising
5 the step of sending a reply denial datagram if the license expiration date is later than the date at which said datagram is received.

88. A method as in claim 80, wherein:
said comparing step includes the step of
10 checking currentness of payments from said license;
and
said reply authorizing datagram is not sent if payment is overdue.

89. A method as in claim 88, further comprising
15 the step of sending a reply denial datagram if payment is overdue.

90. A method as in claim 80, wherein:
said datagrams include data indicative of
the number of processes currently using said product
20 at said licensee's site;
said comparing step includes the step of
comparing a number of processes using said product to
an authorized number; and
said reply authorizing datagram is not sent
25 if said number of processes using said product exceeds
said authorized number.

91. A method as in claim 90, further comprising
the step of sending a reply denial datagram if said

number of processes using said product exceeds said authorized number.

92. A method as in claim 80, wherein said sending step includes the steps of sending said reply
5 authorizing datagram when use of said product is approved and sending a reply denial datagram when use of said product is not approved.

93. A system for controlling a licensed product comprising:

10 a communications facility to which at least one licensee and a licensor are connected at a licensee's site and at a licensor's site, respectively; and

controlling means, connected to said
15 communications facility at said licensor's site, for: receiving a request datagram, said request datagram including an address of said licensee on said communications facility and being transmitted over
20 said communications facility to a site of said licensor; comparing said request datagram with rules and license data to determine if use of said licensed product is authorized; and sending a reply authorizing datagram to said licensee's site if use of said product is approved.

25 94. A system as in claim 93, wherein:

said request datagrams are sent at regular time intervals during use of said licensed product; and

said controlling means comprises means for
30 counting said request datagrams received at said

controlling means and means for computing an amount to be billed to said licensee in response to said counting.

95. A system as in claim 93 wherein:

5 said datagrams include a model number for said product; and

 said controlling means comprises means for counting datagrams for each product model number for each licensee, in order to compute an amount to be
10 billed to each licensee.

96. A system as in claim 93, wherein:

 said controlling means sends a reply denial datagram to said licensee's site if use of said product is not approved.

15 97. A system as in claim 93, wherein:

 said datagrams include a unique identification code; and

 said controlling means incorporates the same request datagram identification code in said reply
20 authorizing datagram.

98. A system as in claim 93, wherein said

controlling means compares said facility address of said licensee with a list of valid licensee facility addresses and does not generate a reply authorizing
25 datagram if said facility address of said licensee is not valid.

99. A system as in claim 98, wherein said controlling means sends a reply denial datagram when said facility address is not valid.

5 100. A system as in claim 93, wherein said controlling means compares an expiration date of a license of said product with a date at which said request datagram is received by said controlling means, and does not generate a reply authorizing datagram, thus denying use of said product, if the
10 license expiration date is earlier than the date at which said request datagram is received.

101. A system as in claim 100, wherein said controlling means sends a reply denial datagram if the license expiration date is earlier than the date at
15 which said request datagram is received.

102. A system as in claim 93, wherein said controlling means generate a reply authorizing datagram, thus denying use of said product, if a payment for the use of said product is overdue.

20 103. A system as in claim 102, wherein said controlling means sends a reply denial datagram if payment for the use of said product is overdue.

104. A system as in claim 93, wherein:
said datagrams include data indicative of
25 the number of processes, at a licensee's site, currently using said product; and
said controlling means does not generate a reply authorizing datagram, thus denying a use of said

product, if more than a predetermined number of processes using said product are running at the licensee's site.

105. A system as in claim 104, wherein said
5 controlling means sends a reply denial datagram if more than said predetermined number of processes using said product are running at the licensee's site.

106. A system as in claim 93, wherein said
10 controlling means sends a reply denial datagram if use of said product is not approved.

107. A system as in claim 93, wherein:
said licensed product comprises an executable
portion and a data portion; and
said system further comprises means for
15 controlling use of said data portion with said
executable portion.

108. A system as in claim 107, wherein said data
portion controlling means is disposed within said
executable portion.

20 109. A system for monitoring a licensed product
comprising:

a communications facility to which at least
one licensee and a licensor are connected at a
licensee's site and at a licensor's site,
25 respectively; and

control means, connected to said
communications facility at a licensor's site, for:
receiving request datagrams, said request datagrams

including an address of said licensee on said communications facility and being transmitted at periodic intervals over said communications facility to said licensor's site; storing an indication of receipt of each of said datagrams; and counting said datagrams from each licensee as an indication of the use by the licensee of said licensed product.

110. A system as in claim 110, wherein:

said request datagrams include a product model number; and

said controlling means separately counts request datagrams for each product model number for each licensee.

1 / 8

FIG. 1

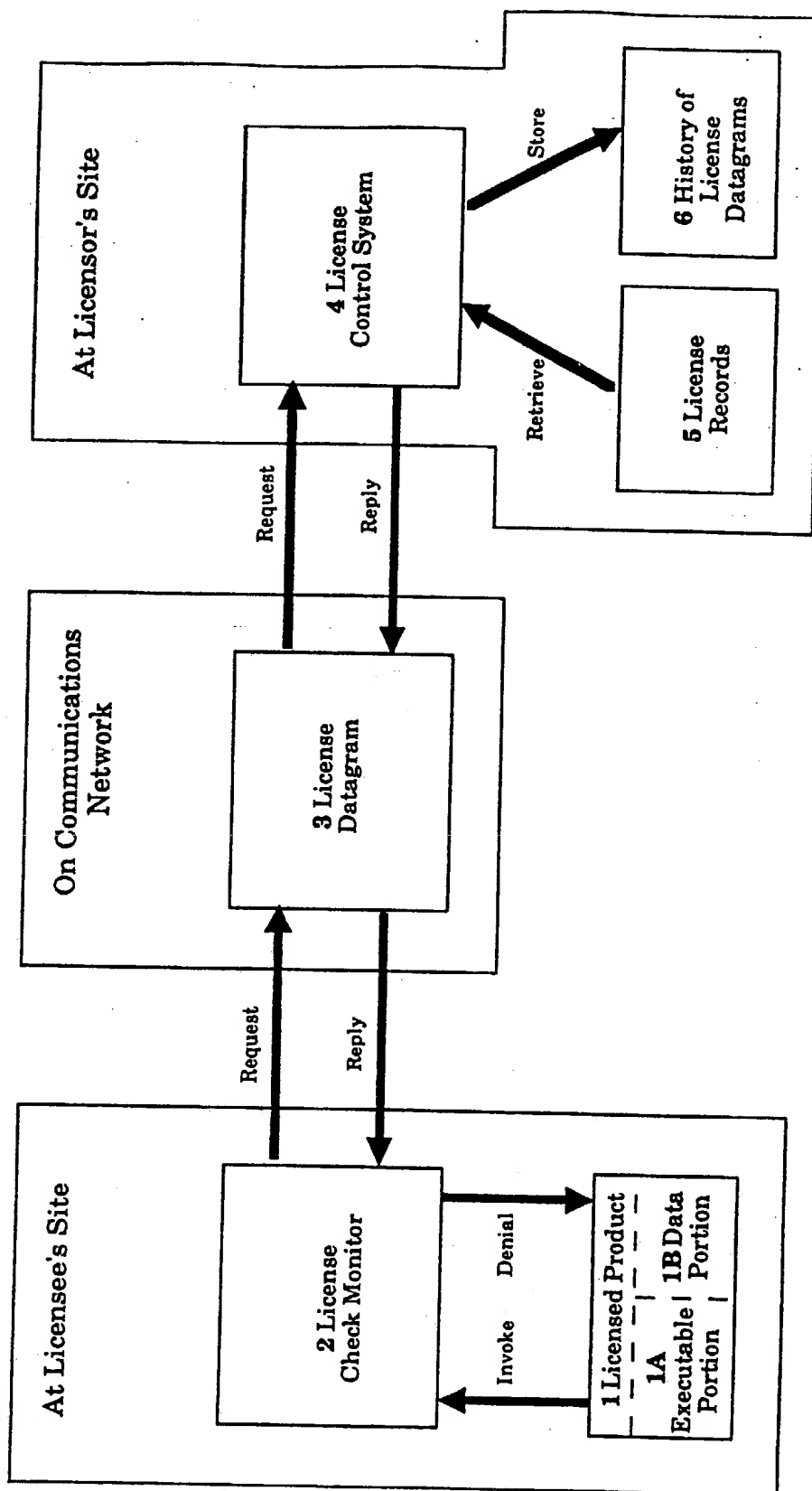
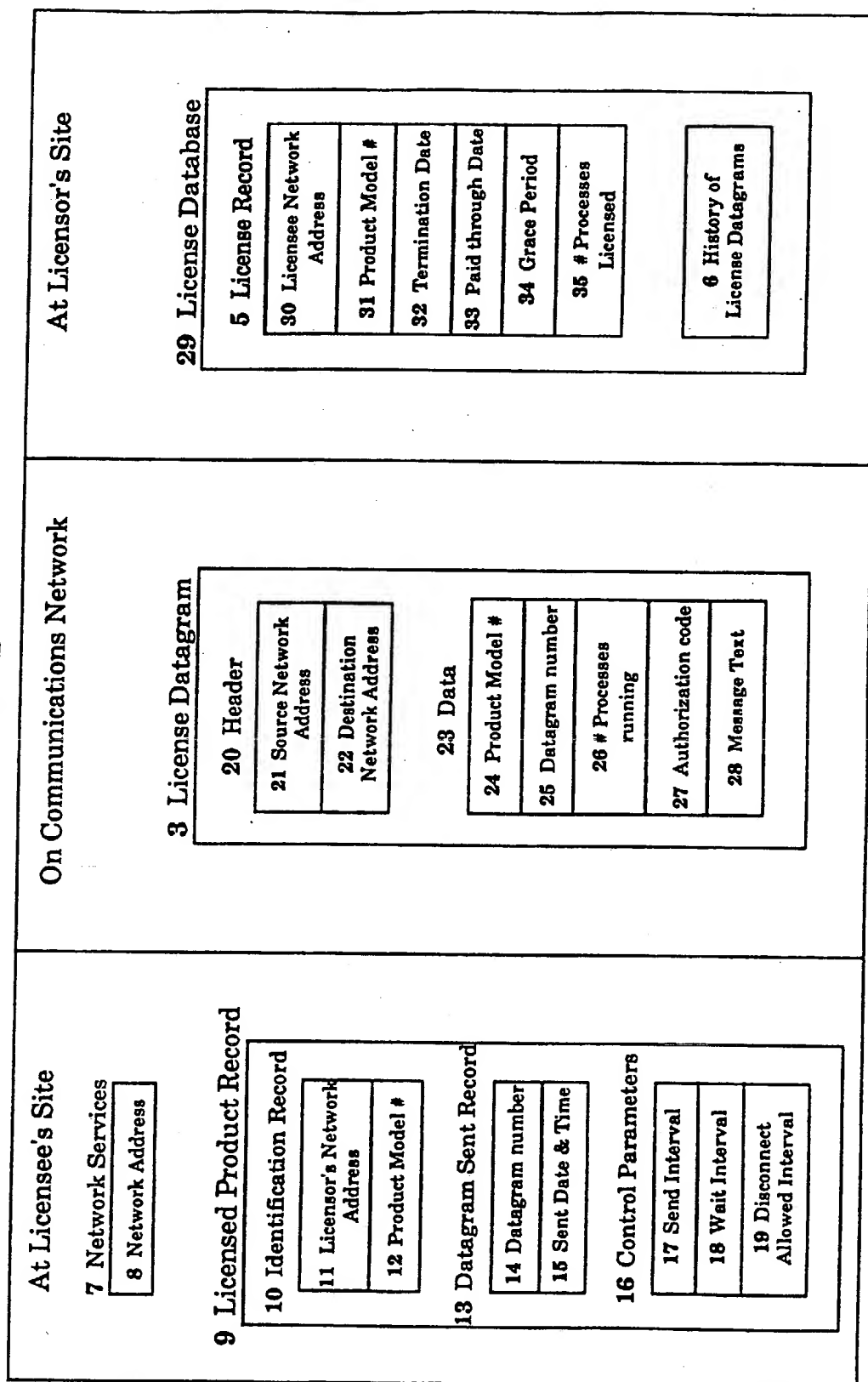
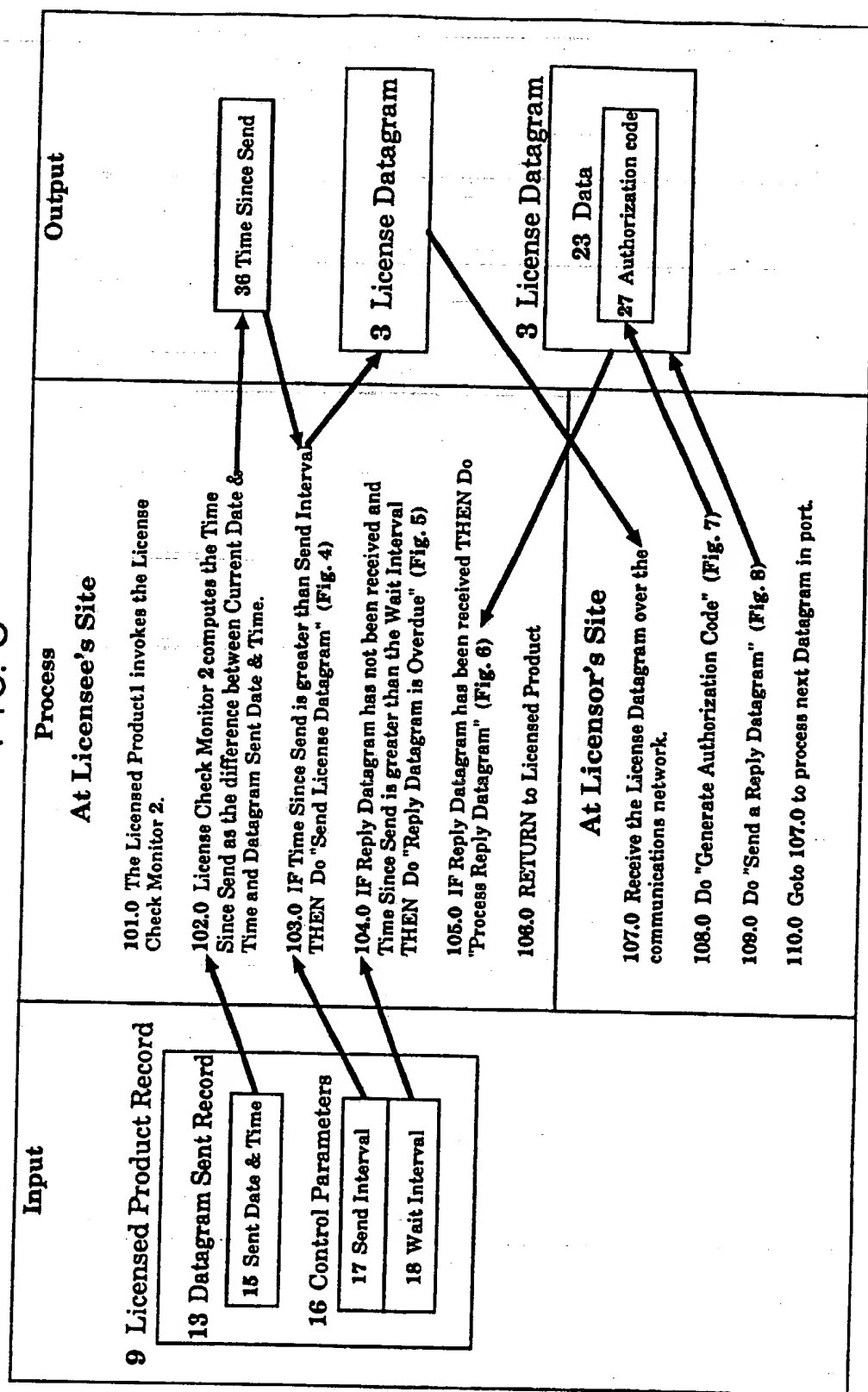


FIG. 2



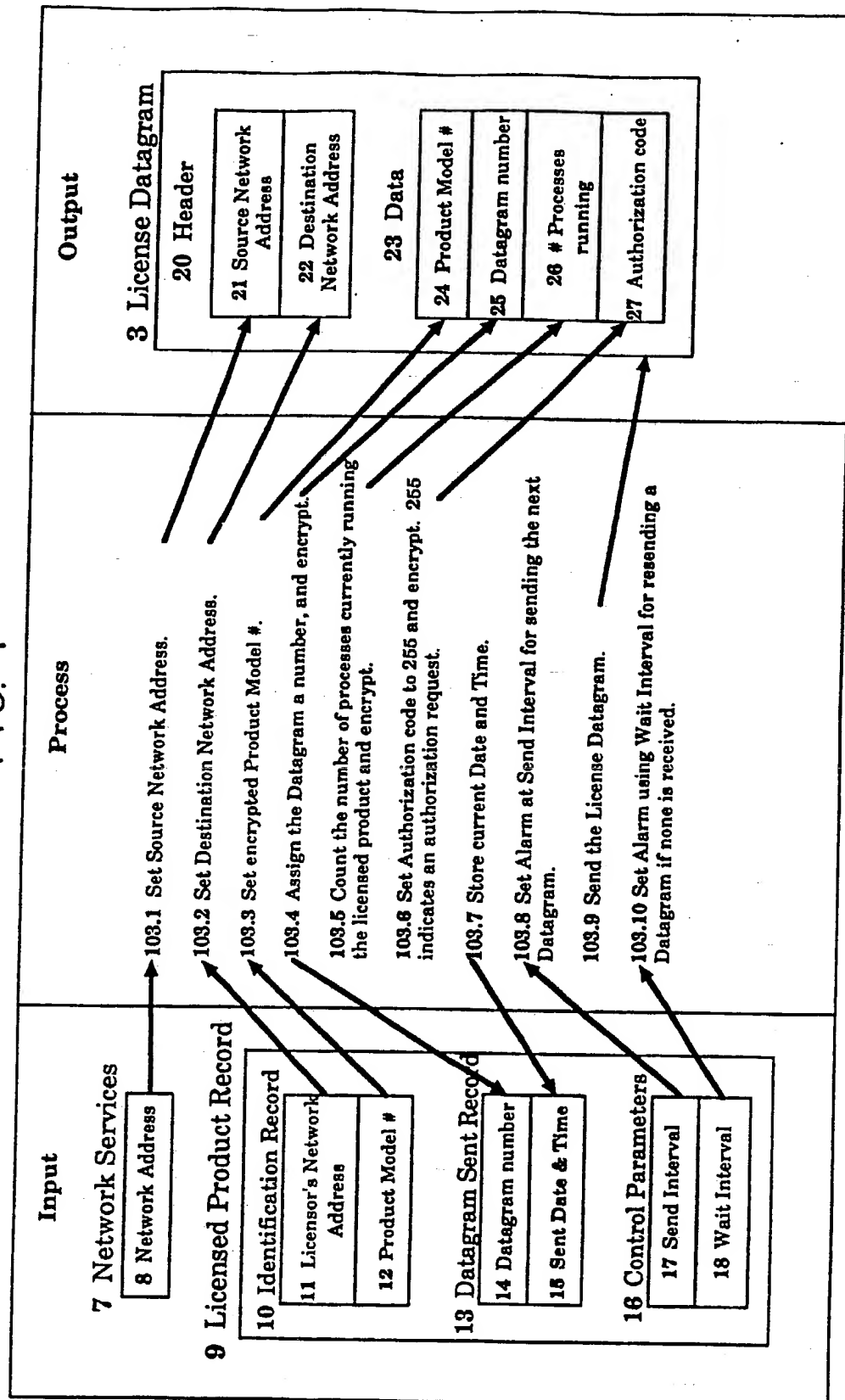
3 / 8

FIG. 3



4 / 8

FIG. 4



SUBSTITUTE SHEET

5 / 8

FIG. 5

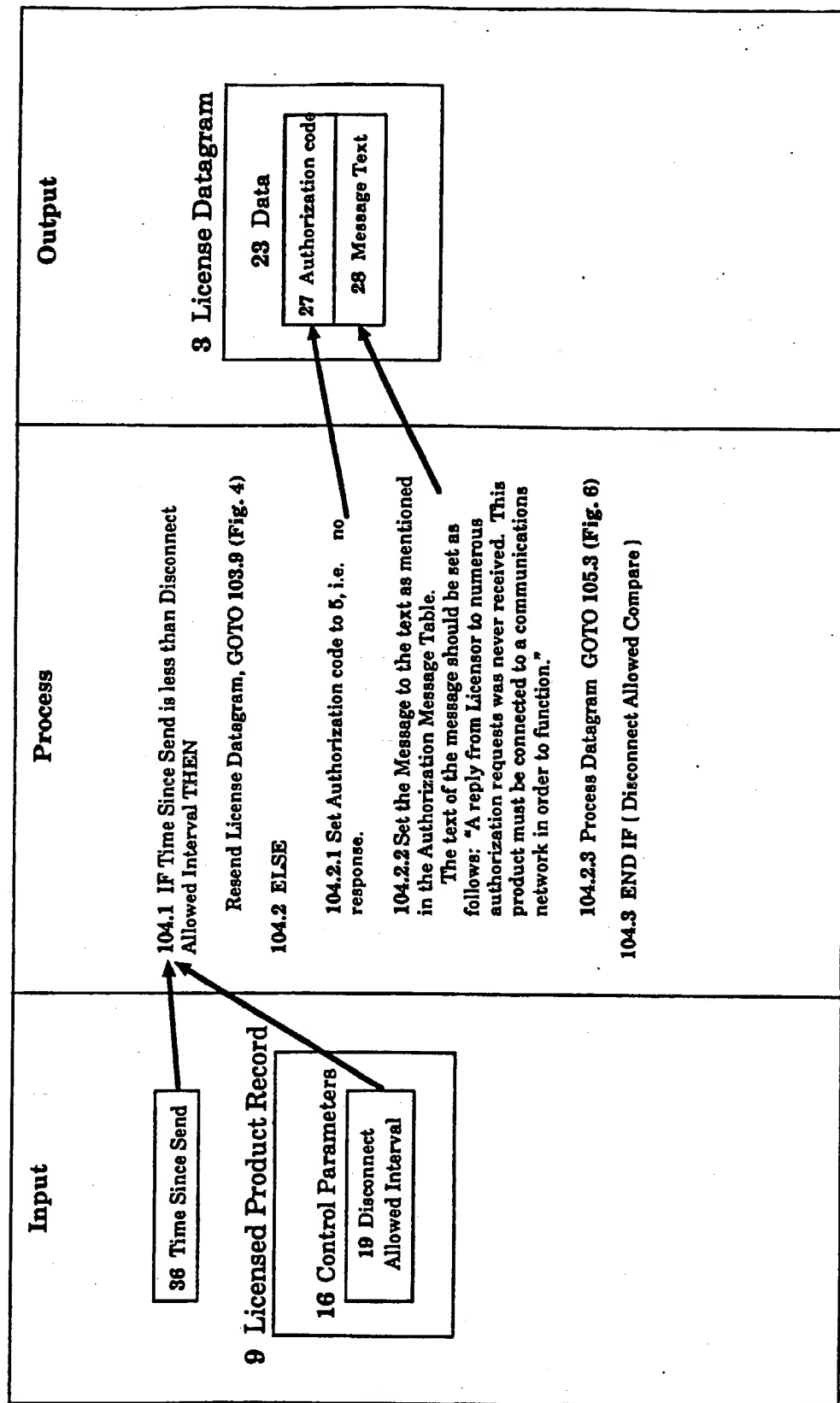
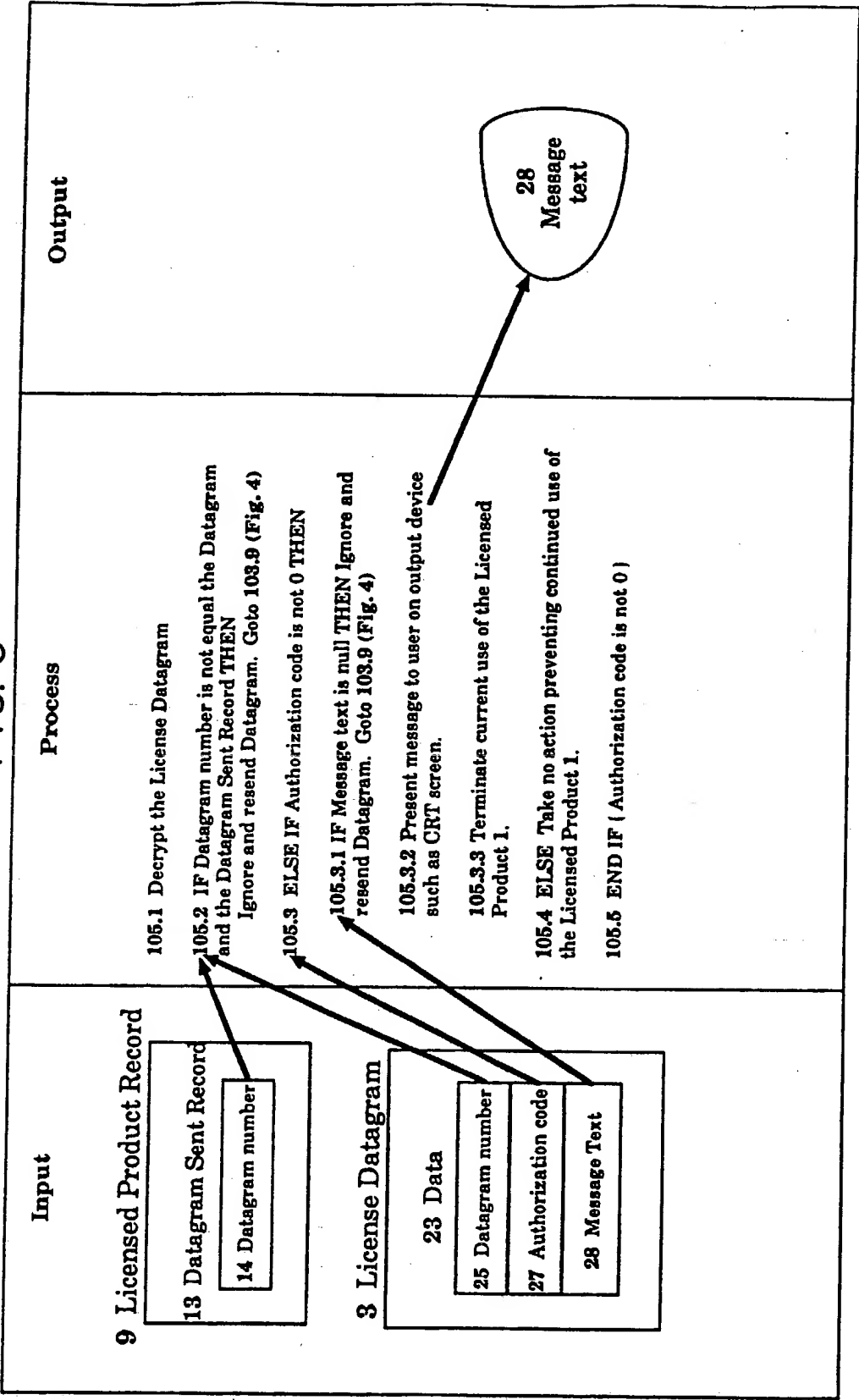
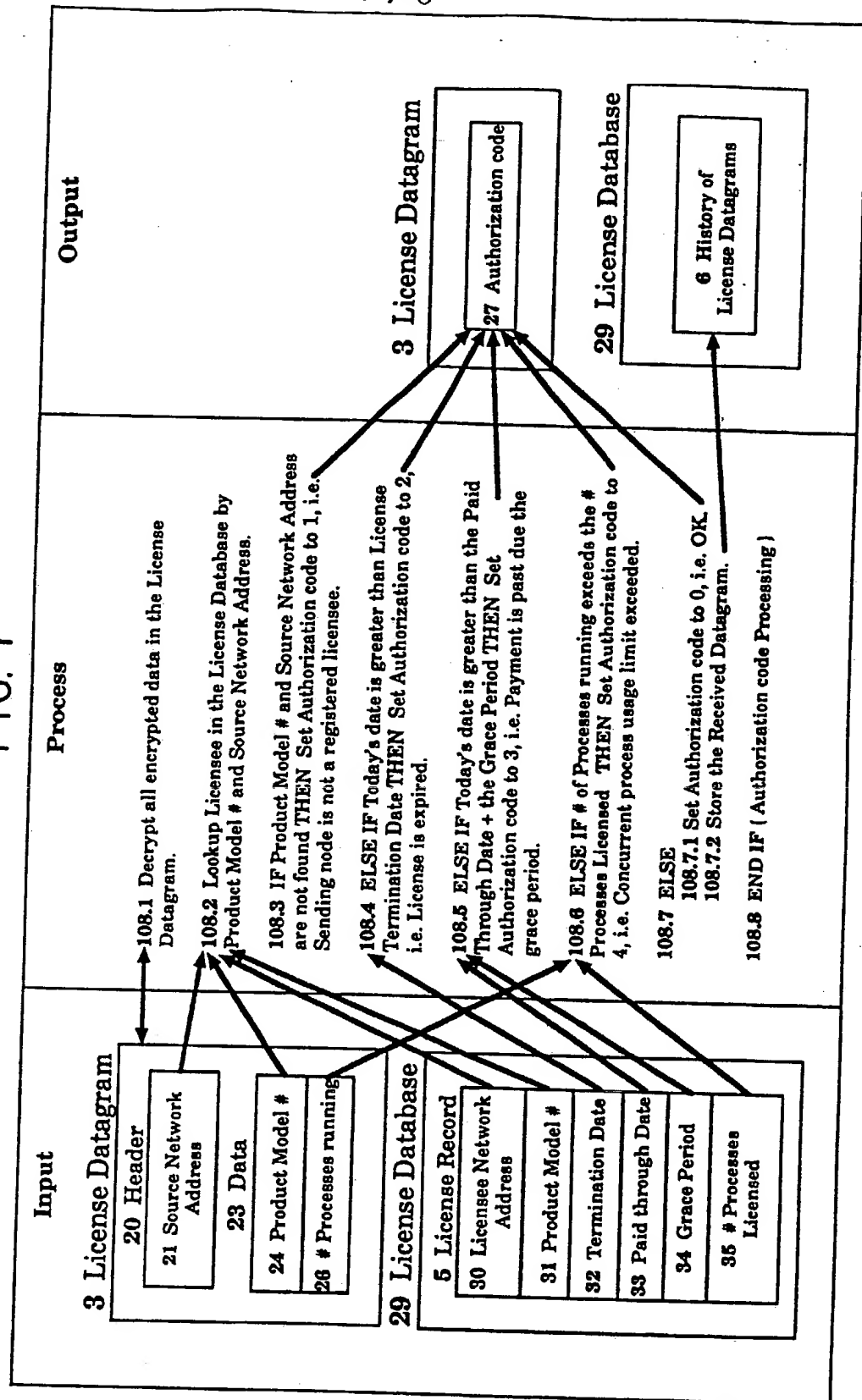


FIG. 6



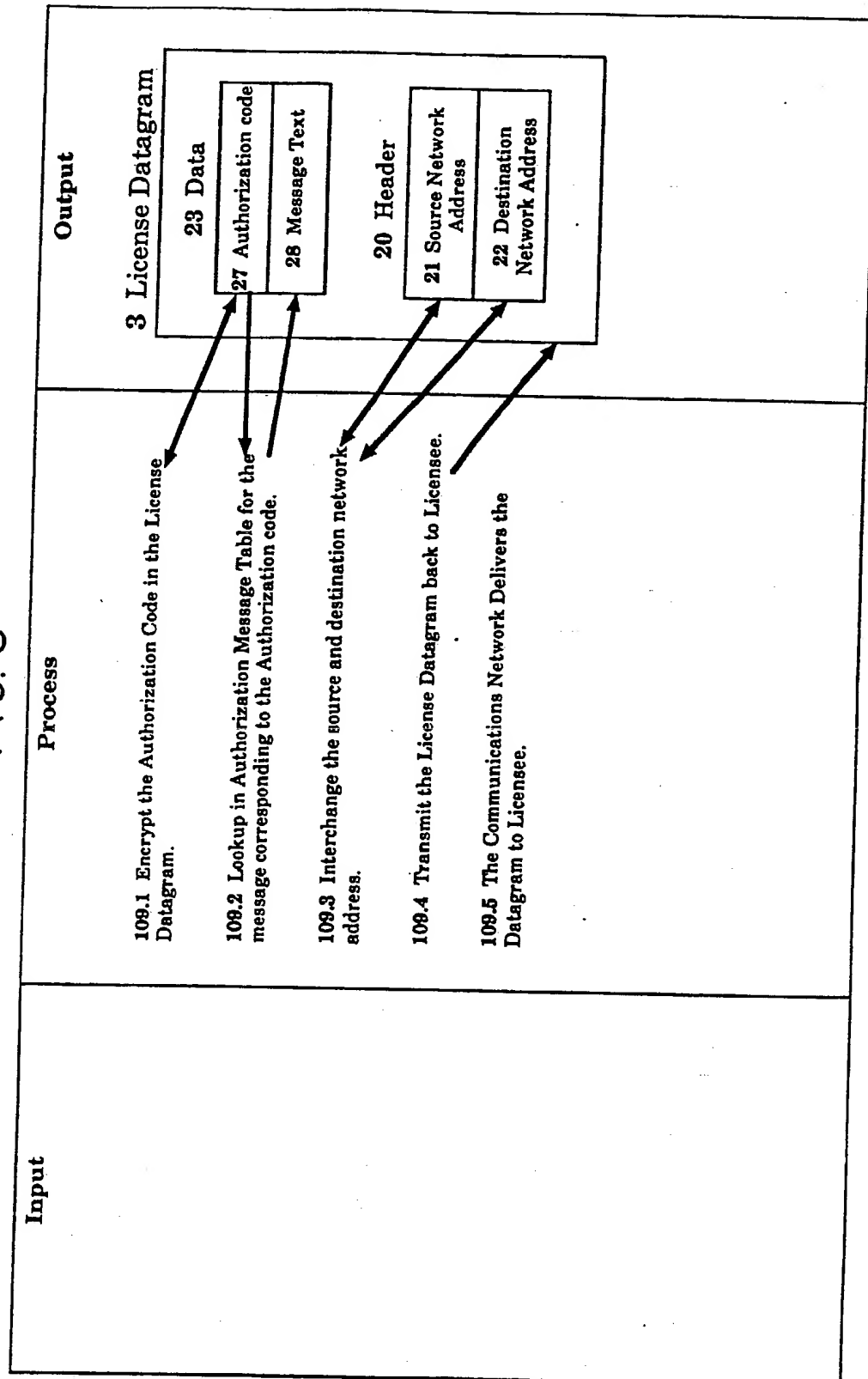
7 / 8

FIG. 7



8 / 8

FIG. 8



SUBSTITUTE SHEET

INTERNATIONAL SEARCH REPORT

 International application No.
 PCT/US92/05387

A. CLASSIFICATION OF SUBJECT MATTER

 IPC(5) : G06F 11/34; H04L 9/00
 US CL : 395/725; 380/4

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 364/406; 380/25

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

APS DATABASE: Software#, information, usage, monitor?, Licenses?

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y,P	US,A, 5,103,476 (WAITE ET AL) 07 APRIL 1992 See entire text.	1-110
Y,P	US,A, 5,050,213 (SHEAR) 17 SEPTEMBER 1991 See column 6, lines 27-51.	1-6,9-21,23-26,29-43,45-53,56-59,61-64,67-73,75-110
Y,P	US,A, 5,047,928 (WIEDEMER) 10 SEPTEMBER 1991 See col. 6, lines 16-54.	1-6,9-21,23-36,29-43,45-53,56-59,61-64,67-73,75-110
Y	US,A, 5,023,907 (JOHNSON ET AL) 11 JUNE 1991 See entire document.	1-110

☒ Further documents are listed in the continuation of Box C.
 ☐ See patent family annex.

* Special categories of cited documents:	* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
A document defining the general state of the art which is not considered to be part of particular relevance	*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
E earlier document published on or after the international filing date	*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*Z* document member of the same patent family
O document referring to an oral disclosure, use, exhibition or other means	
P document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 05 AUGUST 1992	Date of mailing of the international search report 04 NOV 1992
Name and mailing address of the ISA/ Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231	Authorized officer <i>Kenneth S. Kim</i> KENNETH S. KIM
Facsimile No. NOT APPLICABLE	Telephone No. (703) 308-1634

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US92/05387

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US,A, 5,014,234 (EDWARDS, JR.) 07 MAY 1991 See col. 3, lines 4-16.	1-110
Y	US,A, 5,010,571 (KATZNELSON) 23 APRIL 1991 See entire document.	1-6,9-21,23-26,29- 43,45-53,56-59,61- 64,67-73,75-110.
Y	MACMILLAN Publishing Company, 1985, WILLIAM STALINGS, Data and Computer Communications. p199-203.	1-110
Y,P	US,A, 5,113,519 (JOHNSON ET AL) 12 MAY 1992 See col. 6, lines 36-68.	1-110
Y	US,A, 4,937,863 (ROBERT ET AL) 26 JUNE 1990 See col. 3, lines 25-40.	1-6,9-21,23-26,29- 43,45-53,56-59,61- 64,67-73,75-110